Listing of Claims

1. (currently amended) A system for controlling use of at least one resource comprising:

a plurality of addressable locations in the system;

a communication system connecting the addressable locations which transmits communications between the addressable locations;

a plurality of machines or processes, the machines or processes being located [[at]] with at least one of the addressable locations;

a plurality of control programs which use resources including operable to request use of the at least one resource, the control programs comprising a plurality of machine or process control programs, each machine or process control program controlling at least one machine or process; and

a plurality of resource managers, the resource managers being located at different ones [[a plurality]] of the addressable locations, each resource manager communicating over the communication system with at least one other resource manager, and the plurality of resource managers arbitrating which one control program of the plurality of control programs is given exclusive use of the at least one resource during execution of the one control program.

2. (original)   A system in accordance with claim 1 wherein:

the at least one resource is a physical workspace that is at least in part shared by at least two machines.

3. (original)   A system in accordance with claim 2 wherein:

the physical workspace is defined logically.

4. (original)   A system in accordance with claim 1 wherein:

the at least one resource is control of an input/output function shared between the machines.

5. (original)   A system in accordance with claim 1 wherein:

the at least one resource effects transport of items processed by the machines.

6. (original)   A system in accordance with claim 1 wherein:

the at least one resource is control of exchange of tools used by the machines.

7. (original)   A system in accordance with claim 1 wherein:

the at least one resource is control of processing performed at processing stations in a manufacturing process.

8. (original)   A system in accordance with claim 1 wherein:

the at least one resource is control of a sensor system.

9. (original)   A system in accordance with claim 1 wherein:

the control program is executed by a computer located at an addressable location in the system.

10. (original) A system in accordance with claim 9 wherein:

the computer comprises a general purpose industrial computer.

11. (original) A system in accordance with claim 9 wherein:

the computer comprises a personal computer.

12. (original) A system in accordance with claim 9 wherein:

the computer comprises a machine controller.

13. (original) A system in accordance with claim 9 wherein:

the computer comprises a programmable logic controller.

14. (original) A system in accordance with claim 1 wherein:

at least one resource manager is executed by a computer located at an addressable location in the system.

15. (original) A system in accordance with claim 14 wherein:

the computer comprises a general purpose industrial computer.

16. (original) A system in accordance with claim 14 wherein:

the computer comprises a personal computer.

17. (original) A system in accordance with claim 14 wherein:

the computer comprises a machine controller.

18. (original) A system in accordance with claim 1 wherein:

the control program uses a resource that is controlled locally by a resource manager at the same addressable location as the control program.

19. (original) A system in accordance with claim 1 wherein:

the control program uses a resource that is controlled remotely by a resource manager at an addressable location different from the control program.

20. (original) A system in accordance with claim 1 wherein:

the at least one resource comprises a data object.

21. (original) A system in accordance with claim 1 comprising:

a human machine interface, coupled to at least one resource manager, which provides a point of access to the at least one resource manager, to permit establishing of the resources under control of the at least one resource manager, to observe the state of the resources under the control of the at least one resource manager and to modify the state of the resources under the control of the at least one resource manager.

22. (original) A system in accordance with claim 21 wherein:

the human machine interface is local to at least one of the resource managers.

23. (original) A system in accordance with claim 21 wherein:

the human machine interface has access to at least one resource manager through at least one other resource manager.

24. (original) a system in accordance with claim 21 wherein:

the human machine interface is remote from the at least one of the machines controlled by the at least one resource manager.

25. (original) A system in accordance with claim 1 wherein:

during arbitration, at least one resource manager communicates over the communication system to another resource manager which is associated with at least some of the plurality of control programs.

26. (original) A system in accordance with claim 1 comprising:

each resource manager arbitrates access to a plurality of resources with access to the plurality of resources being in a set order;

each resource manager tracks each control program requesting control of the resources and in what order; and

if a control program requests access to at least two resources out of the set order, a warning is issued that a deadlock between the control program requesting access to the at least two resources and another control program is possible.

27. (original) A system in accordance with claim 1 wherein:

the plurality of resource managers collaborate to determine if a set of machine control programs requesting access to a set of resources is found to form a deadlock and then the deadlock state is communicated to the user.

28. (original) A system in accordance with claim 1 wherein:

the plurality of machines are robots which use a plurality of workspaces which at least in part are located within a mutual workspace.

29. (original) A system in accordance with claim 1 wherein:

the control program includes user programmable instructions to the plurality of resource managers to control the state of the at least one resource.

30. (original) A system in accordance with claim 1 wherein:

the communication system is a wireless system.

31. (original) A system in accordance with claim 1 wherein:

the communication system is a wire line system.

32. (original) A system in accordance with claim 30 wherein:

the wire line system is an Ethernet system.

33. (currently amended) A system <u>for controlling use of at least one resource</u> comprising:

a plurality of addressable locations in the system;

a communication system connecting the addressable location<u>s</u> which transmits communications between the addressable locations;

a plurality of machines or processes, the machines or processes being located [[at]] <u>with</u> at least one of the addressable locations;

a group of control programs [[including]] <u>operable to request use of the at least one resource and comprising</u> a plurality of machine or process control programs, each machine or process control program controlling at least one machine or process; and

a plurality of resource managers~~, the resource managers~~ being located at <u>different ones</u> [[a plurality]] of the addressable locations, each resource manager communicating over the communication system with at least one other resource manager, such that the resource managers implement at least one interlock on behalf of <u>the</u> at least one resource, each interlock providing mutually exclusive use of <u>the</u> at least one resource by one of the control programs, each interlock being controlled by programmable instructions from within the one of the control programs.

34. (original) A system in accordance with claim 33 wherein:

the instructions are user instructions.

35. (new) A system for controlling use of a shared workspace comprising:

addressable locations in the system;

a communication system connecting the addressable locations and transmitting communications between the addressable locations;

at least two machines located with at least one of the addressable locations, the at least two machines sharing the workspace;

control programs operable to request use of the shared workspace and comprising control programs controlling the at least two machines; and

resource managers located with different ones of the plurality of the addressable locations, each resource manager communicating over the communication system with at least one other resource manager, and the resource managers arbitrating which one control program is given exclusive use of the shared workspace during execution of the one control program.